Section 11 Contents

Section 11 State Water Plan - Cedar/Beaver Basin

Drinking Water

11.1 Introduction

This section discusses the public and private water supplies in the Cedar/ Beaver Basin. It reviews the systems and their condition. Even though public and private water suppliers provide water for other uses, the primary purpose is for the benefit of people. A public water supply system is defined as one serving at least 15 connections or 25 people 60 days per year.

11.2 Setting

The water supply for all public and private systems in the basin comes from springs and wells. The earliest settlers were quick to pipe spring water to the community to assure a high quality, readily available supply. The quality of the water from springs used for culinary purposes has remained about the same. However, protection of spring areas is mandatory to prevent pollutants from entering these sources of culinary water.

It is expected that most future demands will be met from groundwater supplies. Surface water is not readily available and is also more expensive to develop and treat.

Since a heavy industrial base does not exist, population is the main factor controlling water demand. The amount of culinary water used for irrigating lawns and gardens can substantially impact the daily culinary water use. Culinary water use is measured in gallons per capita per day (GPCD).

The Division of Water Resources recently contracted to obtain more detailed data of current municipal and industrial water use in the Cedar/Beaver Basin.[19] Data from this study were used to determine current uses based on the year 1992.

The total system capacity to deliver water to customers was determined. This is generally less than the volume of supply (source capacity) available. If not, it indicates system capacity will have to be enlarged when the number of

■ Culinary water is always in demand and constant protection is needed to assure a high quality supply. Expected growth will require additional supplies.

Newcastle Reservoir

customers increases. This data are shown in Table 11-1.

The total municipal and industrial (M & I) use is also shown. This is the volume of water delivered to all customers served by the public community water suppliers. This does not include other uses not served by a public community system. It includes residential uses inside and outside the home and commercial, industrial and municipal uses. All of these uses are delivered from water supplies suitable for culinary use.

As can be seen, some communities have reached the limit of their source and/or system capacity. When the demand for deliveries increases, additional water supplies will have to be found. The gallons per capita day (GPCD) use is shown in Table 11-2. The

Table 11-1
PUBLIC COMMUNITY WATER SUPPLY AND USE[19]

Water Supplier	Total Source Capacity (Acre-feet)	Total System Capacity (Acre-feet)	M & I Use (Acre-feet)
Beaver	1,572	700	677
Manderfield	306	127	18
Milford	2,194	934	395
Minersville	960	403	315
Beaver County Total	5,032	2,164	1,405
Angus	142	61	22
Brian Head	604	259	259
Cedar City	14,741	6,354	4,314
Enoch	639	637	639
Escalante Valley	40	21	13
Meadows Ranch	437	184	96
Mid-Valley Estates	181	77	21
Monte Vista	60	44	42
Mt. View	100	47	47
New Castle	150	149	150
Old Meadows	140	61	20
Paragonah	212	98	55
Park West	74	43	42
Parowan	1,606	745	297
Rainbow Ranchos	65	33	16
Summit	171	71	73
Iron County Total	19,362	8,884	6,106
Enterprise	1,043	537	538
Washington County	1,043	537	538
Basin Total	25,437	11,585	8,049

Note: Totals do not include uses outside public water supplier areas. Data based on 1992 values.

Table 11-2
CULINARY WATER DIVERTED PER CAPITA DAY[19]

Water Supplier	Per Capita Use (Gallons)	Water Supplier	Per Capita Use (Gallons)
Beaver County	253	Mt. View	446
Beaver	188	New Castle	518
Manderfield	402	Old Meadows	509
Milford	321	Paragonah	152
Minersville	464	Park West	375
Unincorporated	253	Parowan	143
Iron County	268	Rainbow Ranches	107
Brian Head	304	Summit	393
Cedar City	277	Unincorporated	268
Enoch	268	**Washington County**	411
Escalante Valley	134	Enterprise	411
Meadows Ranch	411	Unincorporated	411
Mid-Valley Estates	312	**Basin Average**	272
Monte Vista	250	**Statewide Average**	265

use appears to be quite variable. Much of this can be attributed to use of culinary water to irrigate lawns and gardens and for golf courses, parks, cemeteries and other outdoor facilities. Use can also vary for different times of the year as there is more outside use during the summer months than during the winter.

The 1992 basinwide average culinary water use per capita day (GPCD) is 272 gallons. The statewide average was 265 gallons in 1991. The GPCD use in the cities and towns ranges from 143 in Parowan to 464 gallons in Minersville. The use rate for other public community systems ranges from 107 at Rainbow Ranchos to 518 at New Castle. The use at New Castle is now considerably less (140-160) since the town installed a secondary system. The GPCD for Brian Head was modified to account for the high proportion of visitors throughout the year.

Much of the variability between cities can be attributed to the amount of culinary water used for outside irrigation. For instance, data for New Castle were gathered before they installed a secondary system which will reduce their GPCD use. The low rates in Parowan and Paragonah indicate the effect of a secondary system.

11.3 Policy Issues and Recommendations

There are no policy issues presented in this section. Refer to Sections 7, 12 and 19 for issues that impact groundwater quality.

11.4 Local Regulatory Organizations

All public drinking water supplies are subject to the Utah Safe Drinking Water Act and the Utah Public Drinking Water Regulations. Laws and

regulations are administered by the Utah Department of Environmental Quality, Division of Drinking Water, that is represented by a district engineer stationed in St. George to service the five-county area. The district engineer generally does not attempt to resolve problems.

Towns, cities and counties all have primary responsibilities for drinking water control within their respective entities. These responsibilities and authorities are contained in Sections 10, 11, 17, 19 and 73 of the *Utah Code Annotated, 1953*, amended. Private water suppliers (i.e., those serving fewer than 15 connections or 25 people) are not regulated.

In addition, the Board of Health, Southwest Utah Public Health Department, has responsibilities for controlling drinking water and individual water well installation and construction. These responsibilities and duties are carried out through their staff. They work closely with the Utah Department of Environmental Quality on related regulations.

When private water systems are proposed to serve new developments, local planning commissions often ask the local health department to evaluate the feasibility of the water supply. However, there are no specific standards regarding the design and construction of these private systems once planning commission approval is received.

11.5 Drinking Water Problems

The demand for high quality water and the potential for contamination of drinking water supplies will increase as the population increases. Much of the drinking water delivered in the basin is pumped from the groundwater reservoirs, so culinary water supplies will be impacted by declining groundwater quality.

Problems can originate from several sources. One source of poor water quality that cannot be controlled is caused by geologic (background) conditions. Other sources of contamination include refuse from human activities such as landfills, chemical contamination from agricultural activities, land use abuse, mineral exploration, mining, construction and accidental hazardous waste spills.

Sediment and salt loading from severely eroding rangeland also contributes to poor water quality. These pollutants are transported downstream to the recharge areas. See Sections 10 and 12 for more information.

There is development taking place in many of the recharge areas. This makes the groundwater recharge areas on the alluvial fans susceptible to contamination which eventually pollutes the underground water reservoirs.

These reservoirs are also used to supply water for various agricultural uses, especially irrigation. Some of the water applied to irrigate crops percolates down through the root zone and returns to the groundwater reservoirs. Through this process, which is carried out year after year, salts are leached from the soil and carried to the groundwater reservoirs. If the volume of this water exceeds the natural recharge of fresh water from other sources, the quality of the groundwater deteriorates. As a result, contamination of groundwater used for drinking has increased gradually over the years. When the groundwater supplies become contaminated with various chemical constituents to the point they do not meet the state drinking water standards, treatment will be required.

There are 43 drinking water systems in the basin including industrial self-supplied. Of these, 21 are classified "Public Community" and 22 are "Public Non-community" systems. There are 400 households in Beaver County and 900 in Iron County with private water supplies. The public community systems are rated by the Utah Division of Drinking Water. These ratings are summarized in Table 11-3. Systems with below standard water quality are not approved when no action is being taken to correct the problem. When corrective action is underway, this is indicated in the rating.

Population projections for the cities and towns in Beaver, Iron and Washington counties were made by the Governor's Office of Planning and Budget. Table 4-1, Figure 4-1 and Figure 4-2 show these projections. These estimates of future population growth are used to project culinary water needs. Most public water suppliers expect an increased demand in the next 20 to 30 years.

Cedar City for example, increased its municipal water delivery by 47 percent from 1981 to 1991. This demand is expected to double by the year 2020. Other public water systems can probably expect increases, although the amount will vary depending on such things as whether a secondary system is in place. Table 11-4 shows the current and projected culinary water diversions for incorporated cities and towns. The projected use is based on the assumption conservation is applied (See Section 17). This conservation factor is applied so the per capita use is reduced 1 percent per year from 1995 until 2010 and one-half percent per year until 2020. This value will vary from community to community.

Table 11-3
PUBLIC COMMUNITY WATER SYSTEMS RATINGS

Rating	Beaver	Iron	Washington	Total
Approved	4	14	1	19
Not Approved	0	1	0	1
Corrective Action Required	0	1	0	1
Total	4	16	1	21

Table 11-4
CURRENT AND PROJECTED CULINARY WATER DIVERSIONS BY INCORPORATED CITIES AND TOWNS

City/Town	Year			
	1992	2000	2010	2020
	(Acre-feet)			
Beaver County				
Beaver	680	760	800	800
Milford	400	570	550	530
Minersville	310	510	540	540
Iron County				
Brian Head	260	320	380	440
Cedar City	4,310	5,010	5,760	6,460
Enoch	640	810	910	1,000
Paragonah	60	60	70	70
Parowan	300	420	470	510
Washington County				
Enterprise	540	530	600	670

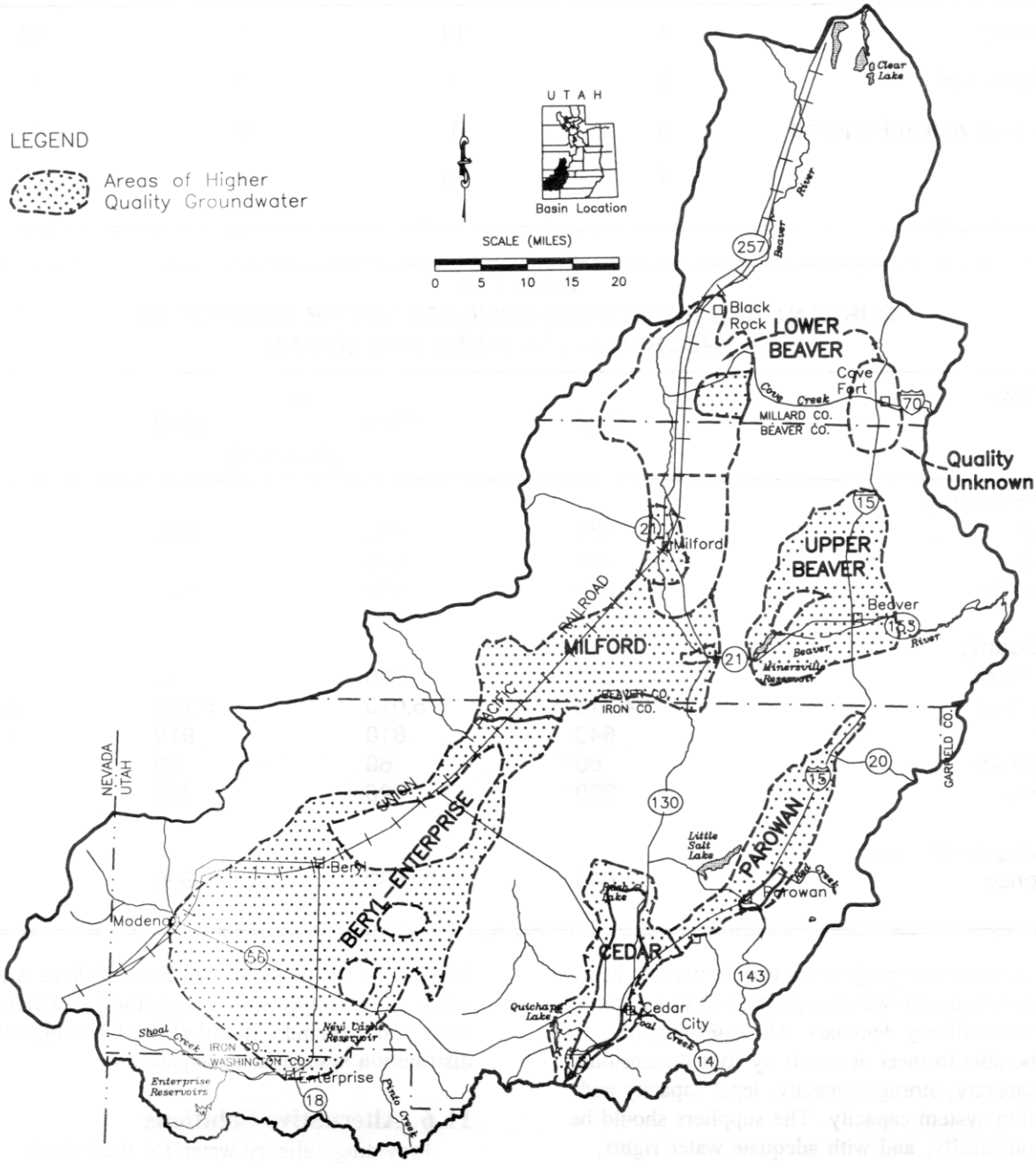
These water use projections can be used to help determine when new water supplies will be needed to meet future culinary demands. All water suppliers should be able to meet demands by four dimensions: source capacity, storage capacity, legal capacity and distribution system capacity. The suppliers should be able to physically, and with adequate water rights, meet the peak daily flow as well as the annual volume.

Storage facilities must have sufficient capacity to meet indoor water demands, lawn and garden irrigation and fire flow demands. During drought years, outside watering could be curtailed. The water distribution system capacity must be adequate to meet demands at the point of use. Even if there is adequate water at the supply source and storage sufficient to meet peak demands, it will all be for naught if the distribution system is inadequate.

11.6 Alternative Solutions

Providing culinary water for the basin's expanding population will determine the development required. The water needed could come from several sources. These include developing surface water and groundwater rights, constructing new reservoirs and converting agricultural water to municipal and industrial uses.

Figure 11-I
HIGHER QUALITY GROUNDWATER AREAS
Cedar/Beaver Basin



SOURCE: ADAPTED FORM TECHNICAL PUBLICATIONS, DIVISION OF WATER RIGHTS

Purchase of the Utah International water right at the iron mines would be an alternative supply for Cedar City. The possibility of a transbasin import from Kolob Reservoir or other sources in the Virgin River Basin has also been considered. But this alternative was recently rejected (See Section 9.6.5).

The current and projected culinary water use from wells by groundwater basin is shown in Table 11-5. At present, some of the water comes from springs, generally in the upper watershed areas. It is expected the increased use of culinary water will come from wells. Purchase of agricultural water rights has the best potential. Use of this water would have to be selective so as to use the best quality water in a given groundwater basin. The groundwater basin areas are shown in Figure 11-1.

Because of the connections between surface water and groundwater, care must be taken when either source is utilized. This situation reiterates the need for regional management of the water resources. ■ ■

Table 11-5[22]
CULINARY WATER USE FROM WELLS

Groundwater Basin	1990	2000	2010 (Acre-feet)	2020
Beaver Area	1,040	1,040	1,130	1,140
Milford Area	640	690	740	720
Parowan	840	890	1,040	1,130
Cedar Valley	1,380	1,850	2,570	2,720
Beryl-Enterprise	870	900	1,130	1,330
Total	4,770	5,370	6,610	7,040